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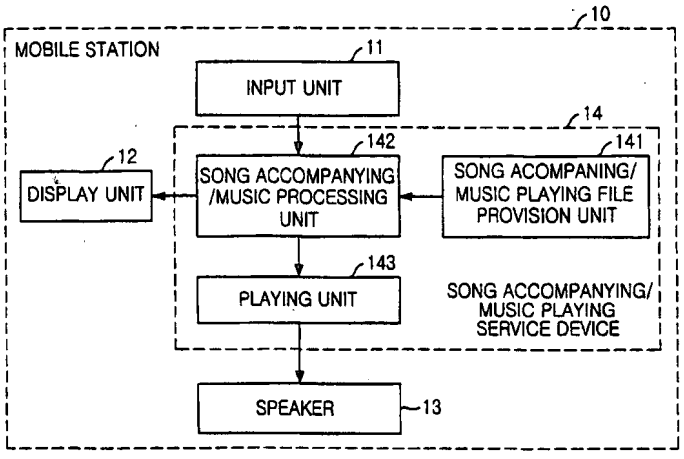

(57) Abstract: An apparatus and method for providing song accompanying/music playing service using a wireless terminal is disclosed. The apparatus for providing song accompanying service in a wireless network interlocked with an Internet, the apparatus includes: a song accompanying file provision unit for receiving a song accompanying file having lyric texts, play order and song accompanying music according to a song through the wireless network; a display unit for displaying the lyric texts and the play order of the song accompanying file; a user input unit for receiving voice of a user in accordance with the play order displayed on the display unit; a song accompanying music processing unit for storing the song accompanying file, providing the lyric texts and the play order of the song accompanying file to the display unit, and outputting the voice of the user and the song accompanying music; a playing unit for playing the song by combining the voice of the user and the song accompanying music from the song accompanying music processing unit; and an outputting unit for outputting the song played by the playing unit.

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APPARATUS AND METHOD FOR PROVIDING SONG ACCOMPANYING/MUSIC PLAYING SERVICE USING WIRELESS TERMINAL

Technical Filed

The present invention relates to an apparatus and method for providing song accompanying/music playing service using a wireless terminal in a wireless communication network, which includes cellular mobile communications of CDMA (Code Division Multiple Access), PCS (Personal Communication System), other mobile communication system used in foreign countries, and so called next generation mobile communication systems such as IMT-2000 (International Mobile Telecommunication-2000), UMTS (Universal Mobile Telecommunication Service), interlocked with an Internet, and a computer readable medium storing program code for realizing the method.

More specifically, The present invention discloses song accompanying/music playing service system, without a heavy weight and expensive portable computer, capable of providing song accompanying data to a light weight wireless terminal (desirably, mobile phone) for additional services such as song accompanying/music playing service by touching a keypad of the wireless terminal with fingers.

Background Art

Generally, accompaniment means making sounds of various musical instruments for singers, and as the development of the electronic engineering, accompaniment played back by electronic sound processing devices replaces a lot of manual accompaniment.

These devices offer accompaniment by synthesizing and signalizing the sound wave from a digital sound module for some musical instruments excluding human voice. Also a

'NORAEBANG' (Karaoke) service, which integrates these electronic devices with television, and gives singers the lyric texts with the background sound and videos on TV for amusement, is common in these days. These accompanying devices include memory units storing accompanying data for many songs, and have to update the memory units periodically for new songs.

For the portability of such accompanying devices outdoors, some portable devices storing the data for some songs are wired or wirelessly connected with an amplifier or TV. However, it is not easy to update the data for the latest song, therefore the devices have to be replaced by the new devices for the latest songs on a regular basis.

As the development of the digital data communication and Internet, people easily download the favorite songs, which are digitalized files including not only the accompaniment data but also the singers' voice data, and listen to them through their computer system with a sound card.

Especially, the various types of musical data in data communication networks, such as Internet, are easy to process and convert according to users' demand and equipment's need. In these cases, desktop PCs (Personal Computers) or portable computers (such as notebook computer) with a sound card are required. Lately, portable devices capable of receiving downloaded and compressed music files through cables from computer system are popular, but even those devices require large memory capacity, and therefore they become expensive.

Nowadays, as wireless communication develops, with wireless communication terminal and portable computer, anybody can access packet data communication network system such as Internet, and search and download data from the network.

But, in those song accompanying system using a

wireless communication, both the portable computer and the wireless communication terminal are necessary, and therefore the portability is limited by the portable computer. Also the portable computer costs pretty much.

Using a wireless communication terminal, downloading MP-3 (Music Player-3) files is possible, but it requires relatively large memory capacity (3 to 5 Mega bytes for 1 song) for a wireless terminal and the transmission speed is too low.

Disclosure of the Invention

Therefore, to solve the above problems, it is an object of the present invention to provide an apparatus and a method for song accompanying/music playing service using a wireless terminal in a hybrid communication network (desirably, wireless communication network interlocked with an Internet/Intranet), and a computer readable medium storing program code for realizing thereof.

In a wireless communication network interlocked with an Internet, an apparatus of the present invention for providing song accompanying service using a wireless terminal comprises: a song accompanying file provision unit for receiving song accompanying files (that is, 'NORAEBANG' files) representing the lyric texts, the singing order, and the accompanying sound for the selected song through the wireless communication network; a display unit for displaying the lyric texts and the singing order of the song accompanying files; a user input unit for receiving voice input of a user in accordance with the singing order displayed on the display unit; a song accompanying processing unit for storing the song accompanying files, providing the lyric texts and the singing order in the song accompanying file to the display unit, and outputting the voice of the singer inputted through the user input unit

and the song accompanying sound excluding the voice of the singer; a playing unit for combining the voice of the singer and the song accompanying sound from the song accompanying processing unit and playing it back; and an outputting unit for outputting the sound played back by the playing unit.

In a wireless communication network interlocked with an Internet, an apparatus of the present invention for providing music playing service using a wireless terminal comprises: a music playing file provision unit for receiving music playing files (that is, Virtual Orchestra System (VOS) file) representing the designated sound in the timing of playing operation by partitioning notes based on the play order and the musical instruments, and the background sound excluding the designated sound through the wireless communication networks; a display unit for displaying electronic musical notes in the music playing file as an electronic musical score that shows the play order of the notes; a user input unit for receiving playing operation inputs from a user in accordance with the play order of notes in the electronic musical score on the display unit; a music playing processing unit for storing the music playing files, converting the notes for a selected musical instrument in the music playing file to an electronic musical score representing the play order, providing the converted score to the display unit, and generating the designated sound manipulated by the user input unit and the background sound excluding the designated sound; a playing unit for combining the designated sound and the background sound from the music playing processing unit and playing it back; and an outputting unit for outputting the sound played back by the playing unit.

A method of the present invention for providing song accompanying service using a wireless terminal, in a

wireless communication network interlocked with an Internet, includes: a first step of dialing the main number for song accompanying service using a wireless terminal and accessing a web server for song accompanying service; and a second step of providing the menu items for song accompanying service to the wireless terminal; and a third step of providing song accompanying files (that is, 'NORAEBANG' file) which represent the lyric texts, the singing order, and the accompanying sound for a selected song in the menu items, in response to the user's request.

Also the method of the present invention for providing song accompanying service further includes: a forth step of downloading and storing the song accompanying file in a storing unit; a fifth step of, in response to user's request, reading the selected song accompanying file among song accompanying files in the storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound; a sixth step of receiving the voice input of the user in accordance with the singing order on the display unit; and a seventh step of combining the voice of the user and the accompanying sound and outputting it.

Also the method of the present invention for providing song accompanying service further includes an eighth step of outputting the achievement mark for the selected song on the display unit.

In a wireless communication network interlocked with an Internet, a method of the present invention for providing music playing service using a wireless terminal includes: a first step of dialing the main number for music playing service using a wireless terminal, and accessing a web server for music playing service; and a second step of providing the menu items for music playing service to the wireless terminal; and a third step of, in response to the user's request, providing music playing files (that is,

Virtual Orchestra System (VOS) files) representing the designated sound in the timing of playing operation by partitioning notes based on the play order and the musical instruments, and the background sound excluding the designated sound.

Also the method of the present invention for providing music playing service further includes: a forth step of downloading and storing the music playing file in a storing unit; a fifth step of, in response to user's request, reading the selected music playing file among music playing files in the storing unit, displaying electronic musical notes in the music playing files as an electronic musical score that shows the play order of the notes, and outputting the background sound; a sixth step of receiving the input operation of the user in accordance with the play order on the display unit; and a seventh step of combining the designated sound and the background sound and outputting it.

Also the method of the present invention for providing music playing service further includes an eighth step of outputting the achievement mark for the selected music on the display unit.

Also the method of the present invention for providing music playing service further includes: a ninth step of dialing the main number for song accompanying service using the wireless terminal, and accessing the web server; a tenth step of providing the menu items for song accompanying service to the wireless terminal; and an eleventh step of, in response to the user's request, providing song accompanying files (that is, 'NORAEBANG' files) which represent the lyric texts, the singing order, and the accompanying sound for a selected song in the menu items.

The method of the present invention for providing music playing service further includes: a twelfth step of

downloading and storing the song accompanying file in a storing unit; a thirteenth step of, in response to user's request, reading the selected NORAEBANG file among NORAEBANG files in the storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound; the fourteenth step of receiving the voice input of the user according to the singing order on the display unit; and a fifteenth step of combining the voice of the user and the accompanying sound and outputting it.

The method of the present invention for providing music playing service further includes a sixteenth step of outputting the achievement mark for the selected song on the display unit.

In the wireless communication system interlocked with an Internet, a computer readable medium of the present invention stores the program codes for realizing: a first function of dialing the main number for the song accompanying service using a wireless terminal and accessing a web server for the song accompanying service; a second function of providing the menu items for song accompanying service to the wireless terminal; and a third function of, in response to the user's request, providing song accompanying files which represent the lyric texts, the singing order, and the accompanying sound for a selected song in the menu items.

The computer readable medium of the present invention further stores the program code for realizing: a forth function of downloading and storing the song accompanying file in a storing unit; a fifth function of, in response to user's request, reading the selected song accompanying file among song accompanying files in the storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound; a sixth function of receiving the voice input of the user in

accordance with the singing order on the display unit; and a seventh function of combining the voice of the user and the accompanying sound, and outputting it.

In the wireless communication system interlocked with an Internet, the computer readable medium of the present invention stores the program code for realizing: a first function of dialing the main number for music playing service using a wireless terminal and accessing a web server for song accompanying service; and a second function of providing the menu items for music playing service to the wireless terminal; and a third function of, in response to the user's request, providing music playing files (that is, Virtual Orchestra System (VOS) files) which represent the designated sound in the timing of playing operation by partitioning notes based on the play order and the musical instruments, and the background sound excluding the designated sound

A computer readable medium of the present invention further stores the program codes for realizing: a forth function of downloading and storing the music playing file in a storing unit; a fifth function of, in response to user's request, reading the selected music playing file among music playing files in the storing unit, displaying electronic musical notes in the music playing files as an electronic musical score that shows the play order of the notes, and outputting the background sound; a sixth function of receiving the input operation of the user in accordance with the play order on the display unit; and a seventh function of combining the designated sound and the background sound and outputting it.

A computer readable medium of the present invention further stores the program codes for realizing an eighth function of outputting the achievement mark for the selected music on the display unit.

The computer readable medium of the present invention

further stores the program codes for realizing: a ninth function of dialing the main number for the song accompanying service using a wireless terminal and accessing a web server for the song accompanying service; a tenth function of providing the menu items for song accompanying service to the wireless terminal; and an eleventh function of, in response to the user's request, providing song accompanying files (that is, 'NORAEBANG' files) which represent the lyric texts, the singing order, and the accompanying sound for a selected song in the menu items.

The computer readable medium of the present invention further stores the program code for realizing: a twelfth function of downloading and storing the song accompanying file in a storing unit; a thirteenth function of, in response to user's request, reading the selected song accompanying file among song accompanying files in the storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound; a fourteenth function of receiving the voice input of the user in accordance with the singing order on the display unit; and a fifteenth function of combining the voice of the user and the accompanying sound and outputting it.

The computer readable medium of the present invention further stores the program codes for realizing a sixteenth function of outputting the achievement mark for the selected song on the display unit.

In this preferred embodiment, the VOS (Virtual Orchestra System) file is used for the music playing file, and the song accompanying music file is made by inserting sync between the lyric texts and the beat to the VOS file.

Brief Description of the Drawings

FIG. 1 is a schematic diagram illustrating the hardware system applied for the present invention.

FIG. 2 is a schematic diagram illustrating an embodiment of a song accompanying/music playing service system in accordance with the present invention

FIG. 3 is a flowchart illustrating an embodiment of song accompanying service method in accordance with the present invention.

FIG. 4 is a flowchart illustrating an embodiment of the music playing service method in accordance with the present invention.

FIG. 5 is a schematic view illustrating the electronic score displaying method in the music playing service in accordance with the present invention.

FIG. 6 is a schematic view illustrating the designated sound output method in the music playing service in accordance with the present invention.

FIG. 7 is a schematic view illustrating the achievement mark displaying method the in the music playing service in accordance with the present invention.

FIG. 8 is a flowchart illustrating an embodiment of the process for partitioning and storing notes for each musical instrument in accordance with the present invention;

FIG. 9 is a schematic view illustrating an embodiment of the method of generating the VOS file in the process for partitioning and storing notes in accordance with the present invention.

FIG. 10 is a schematic view illustrating an embodiment of the complexity adjustment method in the process for partitioning and storing notes for each musical instrument in accordance with the present invention;

FIG. 11 is a schematic diagram illustrating another hardware system applied for the present invention.

FIG. 12 is a comparative diagram between the delta

time information in a digital music file and the absolute time information in a VOS file.

FIG. 13 is a schematic diagram illustrating an embodiment of the conversion process from the delta time information in a digital music file to the absolute time information.

Best mode for Carrying Out the Invention

The previously described object, characteristics, and advantage of the present invention will be more clearly understood through the following description. Referring the attached figures, the best mode will be described in the following.

FIG. 1 is a schematic diagram illustrating the hardware system applied for the present invention, and shows the structure of the hybrid communication system where the wireless communication network is interlocked with an Internet/Intranet.

The interlocking process between an Internet/Intranet and a wireless communication network is explained in the first.

As illustrated in FIG. 1, the hybrid communication system applied for the present invention provides song accompanying/music playing service by interlocking an Internet/Intranet with a wireless communication system such as a mobile telecommunication system through a mobile signal interface 30 and a media transform such as a vocoder 40.

The mobile telecommunication network is equipped with mobile switching centers (MSC), base station controllers (BSC), and a base station transceiver substation (BTS) 20, and communicates with mobile stations 10.

For this technology is well known to the ordinary skilled in the art, the details of the technology except

the signal processing function will not be explained in this description.

The mobile station 10 is a portable communication terminal, and is located in the range covered by any one of base stations. The information on a mobile station is transmitted to mobile switching centers through base station controllers, and the information from a mobile switching center is transmitted to the mobile station 10 through the base station controllers (BSC) and the base station (BTS).

The mobile station 10 can be a terminal for cellular mobile communication, PCS (personal communication system), IMT-2000 (International Mobile Telecommunication-2000), UMTS (Universal Mobile Telecommunication Service), or PDA (Personal Digital Assistants).

Generally, in receiving data burst messages, a mobile communication system uses a paging channel of CDMA type, while, if the line is busy, uses a forward traffic channel. In transmitting messages, it uses an access channel, while, if the line is busy, uses a reverse traffic channel.

Transmitted/Received messages at the mobile station is routed to the base station (BTS), the base station controller (BSC) for high frequency signal processing and call processing, and the mobile switching center (MSC).

The base station (BTS) makes a connection between the mobile stations and the base station controller (BSC), and carries out wired/wireless conversion by carrying out wireless communication with the mobile station 10, while wired communication with the base station controller (BSC).

The base station controller (BSC) coordinates communications among the base stations (BTS) 20 by making a connection between the base station (BTS) 20 and the mobile switching center (MSC), and carries out signal processing for those communications.

The mobile switching center (MSC) deals with call

processing for subscribers, and carries out call setup/release by communicating with the base station controllers and additional service.

As shown above description, when the hybrid communication system interlocking a mobile communication network with an Internet/Intranet provides song accompanying/music playing service through the mobile signal interface and media transform such as vocoder, data coding formats are needed to be transformed for interlocking because the data coding formats available in each network system are different. For this purpose, one network system transforms a data into a common coding format and the other network system retransforms the data into it's own coding format.

For the music file of the song accompanying/music playing service, the VOS (Virtual Orchestra System) files are utilized. The VOS file can be generated from MIDI (Musical Instrument Digital Interface) files and the details of the process are illustrated in FIG. 8.

MIDI has been considered as international standards for the compatibility in transmitting information on playing of musical instruments, and most electronic musical instruments can send/receive the data based on MIDI standards. For example, the electronic musical instruments for domestic use are divided into the electronic organ, the electronic piano, and the electronic keyboard etc., and these instruments synthesize and output sound waves using analog or digital circuits.

MIDI is a kind of international standards for compatibility of the information on playing of musical instruments, and it utilizes the dedicated five-pin cable for sending/receiving channel and system messages. The channel message may include the playing information, such as scale, interval, dynamic and transformation of timbre programs, etc.

Recently, there are many cases where the data can be shared with PCs (Personal Computers), and the electronic musical instruments can be controlled by the PCs. For the PCs to control the musical instruments with a MIDI port, the signals in the PC are required to be converted to MIDI signals for electronic musical instruments, and then the MIDI interface is required for this purpose. The MIDI interfaces may be divided into the intelligent type with CPU and the non-intelligent type without it. In the present technologies, sixteen-different channel information can be transmitted through just one cable, and therefore the concert playing is accomplished by an automatic or manual playing for a single user of plural musical instruments.

A song accompanying file (that is, 'NORAEBANG' file) is formed by inserting sync between the lyric texts and the beat to the VOS file.

In the preferred embodiment of the present invention, the mobile station 10 is supposed to be equipped with the song accompanying/music playing service device 14 of FIG. 2.

A web server 50 provides song accompanying/music playing service programs, and enables users to make use of song accompanying (NORAEBANG) service, or music playing service in solo/orchestra.

The mobile station 10 is connected with the web server 50 through hybrid communication networks. It downloads, installs, and stores the song accompanying (NORAEBANG)/music playing programs, and therefore, realizes the song accompanying (NORAEBANG) and music playing in solo/orchestra.

As illustrated in FIG. 11, based on the VOS files and the song accompanying (NORAEBANG) files, the users, who exist in different countries such as country A (for example USA), country B (for example Japan), country C (for example Korea) ... country N in real space, can sing in chorus or play in orchestra in virtual environment by playing each

own musical instrument. It is realized by synthesizing the users' voices and the accompaniment sound or superposing the designated sound directed by the users and the sound effect of the background sound provided by the system.

For this virtual environment, the web server 50 generates and provides the VOS files representing notes partitioned for each musical instrument from source files such as MIDI files, and the song accompanying (NORAEBANG) files representing the lyric texts, the singing order, and the accompanying sound by inserting sync between the lyric texts and the beat to the VOS files.

As illustrated in FIG. 2, the mobile station 10 includes:

a) a song accompanying/music playing file provision unit (141) for receiving song accompanying (that is, NORAEBANG) files representing the lyric texts, the singing order, and the accompanying sound, or music playing (that is, VOS (Virtual Orchestra System)) files representing the designated sound in the timing of playing operation by partitioning notes based on the play order and the musical instruments, and the background sound excluding the designated sound through wireless communication networks;

b) a display unit for displaying the lyric texts and the singing order of the song accompanying files or the electronic musical notes of the music playing file as an electronic musical score that shows the play order of the notes;

c) a user input unit (a microphone or a keypad) 11 for receiving the voice input of a user in accordance with the singing order or the playing operation inputs from a user in accordance with the play order of notes on the display unit 12;

d) a song accompanying/music processing unit (142) for storing the NORAEBANG or VOS files, providing the lyric texts and the singing order in the NORAEBANG file to the

display unit 12, or converting the notes for the selected musical instrument in the VOS file to an electronic musical score representing the play order and providing the converted score to the display unit 12, and outputting the voice of the singer inputted through a user input unit (microphone) 11 and the song accompanying sound excluding the voice of the singer, or generating the designated sound manipulated by a user input unit (a keypad) and the background sound excluding the designated sound;

e) a playing unit (143) for combining the voice of the singer and the song accompanying sound, or the designated sound and the background sound from the song accompanying/music processing unit and playing it back; and

f) an outputting unit (a speaker) 13 for outputting the sound played back by the playing unit.

In this preferred embodiment, the keypad of the wireless communication terminal is used for the playing operation in music playing service.

The song accompanying/music playing file provision unit (141), the song accompanying/music processing unit (142), and the playing unit (143) construct the song accompanying/music playing service device 14.

Firstly, the process for a NORAEBANG/music playing service by a web server in response to the user's request through wireless communication network will be described in the following.

In this preferred embodiment, the mobile station 10 is supposed to be equipped with the song accompanying/music playing service device 14.

When a user (that is, a customer who wants song accompanying/music playing) calls to the web server 50 (for example, push buttons such as "1+SEND", or only "1" for seconds, and some transformation to different types are obvious), the web server 50 runs a ARS (Automatically Response System) and provides the song accompanying/music

playing service menu items to the user. Voice or SMS (Short Message Service) can be used for providing the song accompanying/music playing service menu as following.

1. NORAEBANG
2. Music playing
3. Introduction
0. Help

Also, instead of ARS, operators (persons) can be hired for the service, but it is well known, and therefore will not be explained in the following description.

It is obvious that the mobile station can be equipped with the NORAEBANG/music playing service menu. In this case, without the downloading step of the service menu, a customer can select songs instantly through the internal NORAEBANG/music playing service menu.

When the customer select "1. NORAEBANG" or "2. Music Playing", the web server 50 reads the index of a database 60 and transmits it to the mobile station 10. The index has large classification (desirably by genre of song), middle classification (desirably by singer), and small classification (desirably by title of song), and the web server 50 searches and transmits the index for customer's request in top-down manner.

It is also obvious that when the customer types a character, the web server searches songs including the character in the database 60, makes a new index instantly and transmits it to the mobile station 10.

The mobile station 10 represents the received index as characters on the display unit 12, and therefore the customer selects and downloads specific songs in the index. It is obvious that the downloaded song can be stored in a storage unit, and downloading step for the songs will be skipped.

It is also obvious that the NORAEBANG service can provide both solo and chorus mode, and the music playing service can provide both solo and orchestra mode.

It is also obvious that keyboard instruments, stringed instruments, percussion instruments, wind instruments etc. can be used for the input unit 11 of the mobile station.

When a keypad is selected for an interface, the shape of a keypad is displayed on a display unit, and the playing direction bar goes down to the displayed keypad sequentially. When a keyboard is selected, the shape of a keyboard is displayed and the playing direction bar goes down to the displayed keyboard sequentially. It is obvious that other interface means can be applied.

The process for a song accompanying service will be described in the following.

FIG. 3 is a flowchart illustrating an embodiment of song accompanying service method in accordance with the present invention.

As illustrated in FIG. 3, in the song accompanying service method in accordance with the present invention, when a user (that is, a customer who wants song accompanying service) calls to a main number for a web server 50 (for example, push buttons such as "1+SEND", or only "1" for seconds, and some transformation to different types are obvious), and requests "1. NORAEBANG" (301), the web server 50 provides the song accompanying/music playing service menu items to the user. The user selects a song through the NORAEBANG/music playing service menu (302), and downloads (303) and stores (304) a NORAEBANG file for the selected song. Also the user can select a song through internal NORAEBANG/music playing service menu, and skip the downloading step if the file for the selected song is already stored in a memory unit.

After that, the user reads the NORAEBANG file for the selected song (305) and plays it back (306). The mobile

station 10 displays the lyric texts and the singing order (for example, by making the characters to be sung blink or displaying them as bold characters) on the display unit 12 (307). When the user sings in accordance with the displayed lyric texts and the singing order (308), the mobile station plays the song (309) by combining the user's voice and the song accompanying sound. The achievement mark can be shown on the display unit 34 (for example, point numbers, or evaluation grade, such as "Excellent", "Very Good", "Good" "Poor"...) (310).

Referring FIG. 4, the process for a music playing service will be described in the following.

FIG. 4 is a flowchart illustrating an embodiment of music playing service method in accordance with the present invention.

As illustrated in FIG. 3, in the music playing service method in accordance with the present invention, when a user (that is, a customer who wants music playing service) calls to a main number for the web server 50 (for example, push buttons such as "1+SEND", or only "1" for seconds, and some transformations into different calling method are obvious), and requests "2. Music playing" (401), the web server 50 provides the song accompanying/music playing service menu items to the user. The user selects the music through the NORAEBANG/music playing service menu (402), and downloads (403) and stores (404) the music playing for the selected music. Also the user can select the music through internal NORAEBANG/music playing service menu, and skip the downloading step if the file for the selected music is already stored in a memory unit.

In other words, the web server makes a list out of the present database 60, provides it to the user, and gets a selection input for playing through a input unit (a keypad) 11.

After that, the web server provides the VOS file,

which is generated from the process for partitioning notes for each musical instrument and storing it (see FIG. 8), to the song accompanying/music playing file provision unit (141) of the mobile station 10. The mobile station 10 reads the information on playing the musical instrument from the song accompanying/music playing file provision unit (141), and stores the information in a fast accessible memory unit for utilizing the information at a real time.

In the music playing process in the mobile station 10, the mobile station 10 provides the list of the musical instruments available for the selected music, and gets the selection input (405). Next, the mobile station 10 displays the electronic score for the selected musical instrument on the display unit (406). In most cases, the length of an electronic score is too long to be shown on a display unit at a time, so the electronic score should be scrolled to the part to be played according to the playing timing. This displaying process is as illustrated in FIG. 5. The notes of part A are transformed to part B.

When the user plays the music in accordance with the electronic score on the display unit 12 through the input unit (a keypad) 11, the song accompanying/music playing processing means (142) recognizes the user's playing (407). The song accompanying/music playing processing unit outputs the notes corresponding to the user input keys (the VOS output messages for the designated sound) (408) and the other notes for the unselected musical instruments (the VOS output messages for the background sound) (409) to the playing unit (143). For the normal (not simplified) electronic score, such as for playing a real MIDI instrument, the input goes out without any simplification step, while, for the simplified electronic score, the note nearest to the real input, instead of the original input, goes out through a simplification step.

For example, as illustrated in FIG. 6, if the user put

downs 'Do' after a lapse of 100s (C) from starting point, while 'Do' of the 5th octave (b) exists at 90s and that of 6th octave (a) is at the 105s in the original music, the notes nearer to the user input, that is, the note at 105s (a) may be decided to be played.

Then, the sound corresponding to the notes played by the user with a musical instrument and the background sound corresponding to the notes played by the song accompanying/music playing processing unit (142) automatically, are mixed at a real-time by the playing unit, and go out through the speaker 13 (410). The achievement mark generated by comparing the user's playing 7b with the original music 7a, can be shown as illustrated in FIG. 7.

When single user plays music, the step of displaying an electronic score (406), receiving the user input (407), outputting the designated sound (408), and the background sound (409) for unselected musical instrument automatically (409), and combining process for orchestral playing are repeated until the playing is over.

When two users play in concert, the designated sound of first and second user are mixed with the sound of other musical instruments, which are not played by the users, at a real time, and the orchestral (concert) playing is accomplished by making the mixed sound heard to each user using communication networks such as Internet. It is obvious that the concert playing for more than two users follows the same way.

FIG. 8 is a flowchart illustrating an embodiment of the method for partitioning notes for each musical instrument and storing them, which shows the process that the web server 50 generates the VOS file in the music playing service. FIG. 12 is a comparative diagram for explaining the concept of the delta time information in an ordinary digital music file and the absolute time information in the VOS file in accordance with the music

playing service method of the present invention, and FIG. 13 is a flowchart illustrating the conversion procedure of the delta time information to the absolute time information in accordance with the present invention.

As illustrated in FIG. 8, in the generating process of the VOS file, the web server 50 classifies MIDI messages to obtain necessary information in a MIDI file (a digital music file in MIDI format utilized as a source file in this music playing system) on the basis of type and stores them in a database 60 (110). The messages are divided into control messages (such as volume control, sound effect, etc), playing messages, and musical instrument configuration messages etc., and the time domain of the entire messages in the MIDI file is defined as a delta time. In the delta time system, all the time information of messages is decided based on a time gap between the prior time information and the current time information (see FIG. 12).

During the formation of the VOS file in the present invention, the MIDI format message defined as the delta time have to be converted to those of the absolute time for a Virtual Orchestral playing (802).

The meaning of the delta time and absolute time is easily understood by FIG. 12 illustrating the display of the time information on messages to be played. That is, in FIG. 12, the left part shows the delta time information and the right part the absolute time information.

Also, the conversion of the delta time to the absolute time can be explained by the flowchart of FIG. 13. That is, the conversion of the delta time information of the MIDI format message to the absolute time information is accomplished by an initialization of setting the first value of the delta time (usually '0') as the initial value of the absolute time (121), and it repeatedly performs the steps of deciding if there is any unconverted delta time

information (123) and setting the absolute time value of the current target message by adding the current delta time value of target message to the previous absolute time value (125) until there is no more messages having unconverted delta time information.

Then, in a construction of the note messages for users to play, the present invention forms a VOS file so that a user may select just one musical instrument through all the playing time, change the instrument during the playing time, or plural users may play with each their own musical instrument simultaneously.

In some cases, the input unit for playing all the range of notes without any modification such as simplification may be required, but in most cases unskilled people don't have ability to play such a sophisticated musical instrument. Then the simplification of the playing operation is necessary so that unskilled people play musical instruments without excessive training, and, on the contrary, for the advanced player, the complication of the playing operation may be required (803).

For example, the simplification process of a musical score will be described in the following referring to FIG. 9 and 10.

Referring to FIG. 9 all the range of notes can be confined within just one octave by removing the octave element in notes (see "g" of 9a and 9b). Among the notes, semi-tones can be replaced with whole-tones (see "e" of 9a and 9b). Through these processes, the original musical score 9a can be simplified to a new type of electronic musical score 9b (804). However, such a new electronic musical score 9b actually has both the original information for users to direct the normal playing and the simplified information.

Also, if necessary, additional modification, such as a change of the arrangement of the note and deletion of the

notes to be played, can be made for the new style electronic score generated in the above steps (805). For example, an editor can be used for adjusting the complexity by deleting the notes, as illustrated in FIG. 5.

On the other hand, when the original score has idle time, or is modified by changing the arrangement or deleting the notes, additional advertising information (advertising words, images, sound clips for some corporation, goods, music) can be inserted for such idle time. In this case, specification of the display time for the advertising information with the information itself enlarges the utility of the VOS file.

Finally, the VOS file is generated (806).

In the present invention, for amusement of users, users can have one's own character images in virtual space, and transform them in accordance with the quantity of playing time or the grade of achievement mark. And it can be compared with other users character image through networks.

For example, when a user gets good grades for playing, his character image (shape of human, pat, figure etc.) can be grown or updated. So the user becomes to regard it as a sort of pat on virtual space, and therefore the user becomes more interested in the service. On the other hand, when a user gets bad grades, his character images show bad expression, get reduced in size, or are degenerated.

The achievement of users can be connected with the variation of character images such as dancing, delighted expression, some gesture, or voice message for congratulating. The display of fireworks images or the blink of screen can be used too. The user's achievement also can be connected with electronic games. That is, the armors or advantageous positions used in the electronic games can be given in reward for user's achievement.

Also, free gifts, gift certificates, qualification for

some events, or electronic cash for e-commerce may be given in reward for user's achievement.

As described above, in this embodiment, the VOS (Virtual Orchestra System) file is supposed to be used for a song accompanying/music playing file, but it is not confined to the VOS file. For example, MIDI file also can be used for the song accompanying/music playing service using wireless terminal, and it is obvious that such a transformation has the same effect as the embodiment of the present invention and is within the technical aspect of the present invention.

Also, in this preferred embodiment, the song accompanying (NORAEBANG) service and the music playing service are explained separately, but it is only for understanding of the present invention, and it is obvious that the two services can be provided independently or simultaneously.

Industrial Applicability

As apparent from above description, in the present invention, the apparatus for song accompanying/music playing can be implemented at a low cost by using wireless communication terminal, and any subscribers (or users) for wireless communication can enjoy NORAEBANG/music playing service with his own favorite songs. The NORAEBANG/music playing service can be a very useful game for leisure, amusement, even development of sensibility.

As apparent from above description, in the present invention, users can sing in chorus with other users in a virtual environment as if in real environment, and even the unskilled users are able to play the favorite music easily. And, one or more distributed users can play in orchestra with each own virtual musical instrument without any expensive real musical instruments, studio, or other

equipments.

The present invention is not confined to the embodiments or attached figures, for it is clear that the replacement, transformation or modification is obvious for the skilled man in the art within the technical aspect of the present invention.

claims

1. An apparatus for providing song accompanying service using a wireless terminal in a wireless communication network interlocked with an Internet, the apparatus comprising:

a song accompanying file provision unit for receiving song accompanying files representing the lyric texts, the singing order, and the accompanying sound for a selected song through said wireless communication network;

a display unit for displaying the lyric texts and the singing order of said song accompanying files;

a user input unit for receiving voice input of a user in accordance with the singing order displayed on said display unit;

a song accompanying processing unit for storing said song accompanying files, providing the lyric texts and the singing order in said song accompanying file to said display unit, and outputting the voice of the singer inputted through said user input unit and the song accompanying sound excluding the voice of the singer;

a playing unit for combining the voice of the singer and the song accompanying sound from said song accompanying processing unit and playing it back; and

an outputting unit for outputting the sound played back by said playing unit.

2. An apparatus for providing music playing service using a wireless terminal in a wireless communication network interlocked with an Internet, the apparatus comprising:

a music playing file provision unit for receiving music playing files representing the designated sound in the timing of playing operation by partitioning notes based on the play order and the musical instruments, and the

background sound excluding the designated sound through said wireless communication networks;

a display unit for displaying electronic musical notes in said music playing file as an electronic musical score that shows the play order of the notes;

a user input unit for receiving playing operation inputs from a user in accordance with the play order of notes in said electronic musical score on said display unit;

a music playing processing unit for storing said music playing files, converting the notes for a selected musical instrument in said music playing file to an electronic musical score representing the play order, providing said converted score to said display unit, and generating the designated sound manipulated by said user input unit and the background sound excluding said designated sound;

a playing unit for combining the designated sound and the background sound from said music playing processing unit and playing it back; and

an outputting unit for outputting the sound played back by said playing unit.

3. The apparatus as set forth in claim 2, wherein said user input unit is a keypad for said wireless terminal.

4. A method for providing song accompanying service using a wireless terminal in a wireless communication network interlocked with an Internet, the method comprising:

a first step of dialing the main number for song accompanying service using a wireless terminal and accessing a web server for song accompanying service;

a second step of providing the menu items for song accompanying service to said wireless terminal; and

a third step of providing song accompanying files,

which represent the lyric texts, the singing order, and the accompanying sound for a selected song in said menu items in response to the user's request.

5. The method as set forth in claim 4, further comprising:

a forth step of downloading and storing said song accompanying file in a storing unit;

a fifth step of reading the selected song accompanying file among song accompanying files in said storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound in response to user's request;

a sixth step of receiving the voice input of the user in accordance with the singing order on said display unit; and

a seventh step of combining the voice of the user and the accompanying sound, and outputting it.

6. The as set forth in claim 4, further comprising an eighth step of outputting the achievement mark for the selected song on said display unit.

7. The method as set forth in any one of claims 4 to 6, wherein said wireless terminal is equipped with said menu items for song accompanying service, requests the selection of a song by providing said menu items, stores said song accompanying files from said web server in said storing unit, and, if selected song accompanying file exists in said storing unit, plays back said song accompanying file in response to user's request without downloading said song accompanying file from web server.

8. The method as set forth in claim 7, wherein said service menu includes large classification (desirably by

genre of song), middle classification (desirably by singer), and small classification (desirably by title of song).

9. A method for providing music playing service using a wireless terminal in a wireless communication network interlocked with an Internet, the method comprising:

a first step of dialing the main number for music playing service using a wireless terminal. and accessing a web server for music playing service;

a second step of providing the menu items for music playing service to said wireless terminal; and,

a third step of providing music playing files representing the designated sound in the timing of playing operation by partitioning notes based on the play order and the musical instruments and the background sound excluding the designated sound in response to the user's request.

10. The method set forth in claim 9, further comprising:

a forth step of downloading and storing said music playing file in a storing unit;

a fifth step of reading the selected music playing file among music playing files in said storing unit, displaying electronic musical notes in said music playing files as an electronic musical score that shows the play order of the notes and outputting the background sound in response to user's request;

a sixth step of receiving the input operation of the user in accordance with the play order on said display unit; and

a seventh step of combining the designated sound and the background sound and outputting it.

11. The method as set forth in claim 10, further comprising an eighth step of outputting the achievement

mark for the selected music on said display unit.

12. The method as set forth in claim 9, further comprising:

a fourth step of dialing the main number for song accompanying service using said wireless terminal and accessing said web server;

a fifth step of providing the menu items for song accompanying service to said wireless terminal; and

a sixth step of providing song accompanying files, which represent the lyric texts, the singing order, and the accompanying sound for a selected song in said menu items in response to the user's request.

13. The method as set forth in claim 12, further comprising:

a seventh step of downloading and storing said song accompanying file in a storing unit;

an eighth step of reading the selected song accompanying file among song accompanying files in said storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound in response to user's request;

a ninth step of receiving the voice input of the user according to the singing order on said display unit; and,

a tenth step of combining the voice of the user and the accompanying sound and outputting it.

14. The method as set forth in claim 13, further comprising an eleventh step of outputting the achievement mark for the selected song on said display unit.

15. The method as set forth in any one of claims 9 to 14, wherein said wireless terminal is equipped with said menu items for music playing service, requests the

selection of a music playing file by providing said menu items, stores said music playing files from said web server in said storing unit, and, if selected music playing file exists in said storing unit, plays back said music playing file in response to user's request without downloading said music playing file from web server.

16. The method as set forth in any one of claims 9 to 14,

wherein the third step includes;

a fourth step of classifying MIDI messages by type and storing them in said storing unit to get necessary information from musical message in MIDI files;

a fifth step of converting the delta time information in said MIDI file to the absolute time information and classifying users based on the relation to the musical instruments;

a sixth step of generating an electronic score by simplifying the playing style to make it easy to play said musical instruments; and

a seventh step of generating the music playing file after coordinating the complexity of playing by changing the position of notes, omitting notes from said electronic score generated through the sixth step.

17. The method as set forth in any one of claims 9 to Claim 14, wherein said web server, in the single-user mode, plays the music by combining the designated sound from a user in accordance with said electronic musical score and the background sound, while in the multi-user mode, plays in orchestra by combining the designated sound from plural users and the background sound.

18. The method as set forth in any one of claims 12 to 14, wherein the song accompanying music file is formed by

inserting synchronization between the lyric texts and the beat to said music playing file.

19. In the wireless communication system interlocked with an Internet, a computer readable medium comprising program codes for realizing:

a first function of dialing the main number for the song accompanying service using a wireless terminal and accessing a web server for the song accompanying service;

a second function of providing the menu items for song accompanying service to said wireless terminal; and

a third function of providing song accompanying files which represent the lyric texts, the singing order, and the accompanying sound for a selected song in said menu items in response to the user's request.

20. The computer readable medium as set forth in claim 19, further comprising program codes for realizing:

a forth function of downloading and storing said song accompanying file in a storing unit;

a fifth function of reading the selected song accompanying file among song accompanying files in said storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound in response to user's request;

a sixth function of receiving the voice input of the user in accordance with the singing order on said display unit; and

a seventh function of combining the voice of the user and the accompanying sound and outputting it.

21. The computer readable medium as set forth in claim 20, further comprising program codes for realizing an eighth function of outputting the achievement mark for the selected song on said display unit.

22. In the wireless communication system interlocked with an Internet, a computer readable medium comprising program codes for realizing:

a first function of dialing the main number for music playing service using a wireless terminal and accessing a web server for song accompanying service;

a second function of providing the menu items for music playing service to said wireless terminal; and,

a third function of providing music playing files which represent the designated sound in the timing of playing operation by partitioning notes based on the play order and the musical instruments, and the background sound excluding the designated sound in response to the user's request.

23. The computer readable medium storing program codes as set forth in claim 22, further comprising program codes for realizing:

a forth function of downloading and storing said music playing file in a storing unit;

a fifth function of reading the selected music playing file among music playing files in said storing unit, displaying electronic musical notes in said music playing files as an electronic musical score that shows the play order of the notes, and outputting the background sound in response to user's request;

a sixth function of receiving the input operation of the user in accordance with the play order on said display unit; and

a seventh function of combining the designated sound and the background sound and outputting it.

24. The computer readable medium as set forth in claim 20, further comprising program codes for realizing an

eighth function of outputting the achievement mark for the selected music on said display unit.

25. The computer readable medium as set forth in claim 24, further comprising program codes for realizing:

a fourth function of dialing the main number for the song accompanying service using a wireless terminal and accessing a web server for the song accompanying service;

a fifth function of providing the menu items for song accompanying service to said wireless terminal; and

a sixth function of providing song accompanying files which represent the lyric texts, the singing order, and the accompanying sound for a selected song in said menu items in response to the user's request.

26. The computer readable medium storing program codes as set forth in claim 25, further comprising program codes for realizing:

a seventh function of downloading and storing said song accompanying file in a storing unit;

a eighth function of reading the selected song accompanying file among song accompanying files in said storing unit, displaying the lyric texts and the singing order on a display unit, and outputting the accompanying sound in response to user's request;

a ninth function of receiving the voice input of the user in accordance with the singing order on said display unit; and

a tenth function of combining the voice of the user and the accompanying sound and outputting it.

27. The computer readable medium as set forth in claim 26, further comprising program codes for realizing an eleventh function of said wireless terminal outputting the achievement mark for the selected song on said display unit.

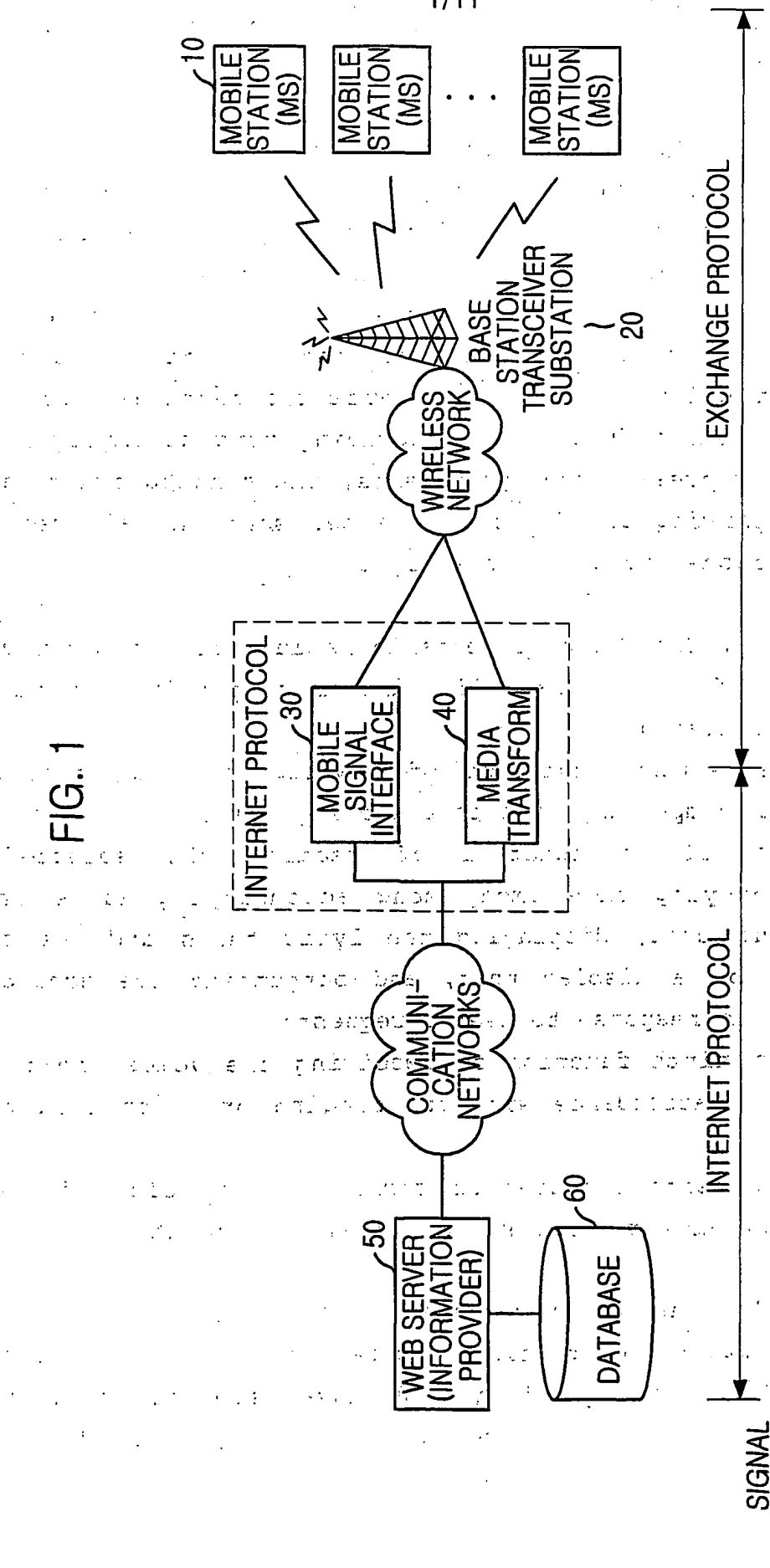

MOBILE STATION (MS)
10
MOBILE STATION (MS)
MOBILE STATION (MS)
BASE STATION TRANSCEIVER SUBSTATION
20
WIRELESS NETWORK
INTERNET PROTOCOL
MOBILE SIGNAL INTERFACE
30
MEDIA TRANSFORM
40
COMMUNI-CATION NETWORKS
WEB SERVER (INFORMATION PROVIDER)
50
DATABASE
60
EXCHANGE PROTOCOL
INTERNET PROTOCOL
SIGNAL INTERLOCKING

FIG. 1

FIG. 2

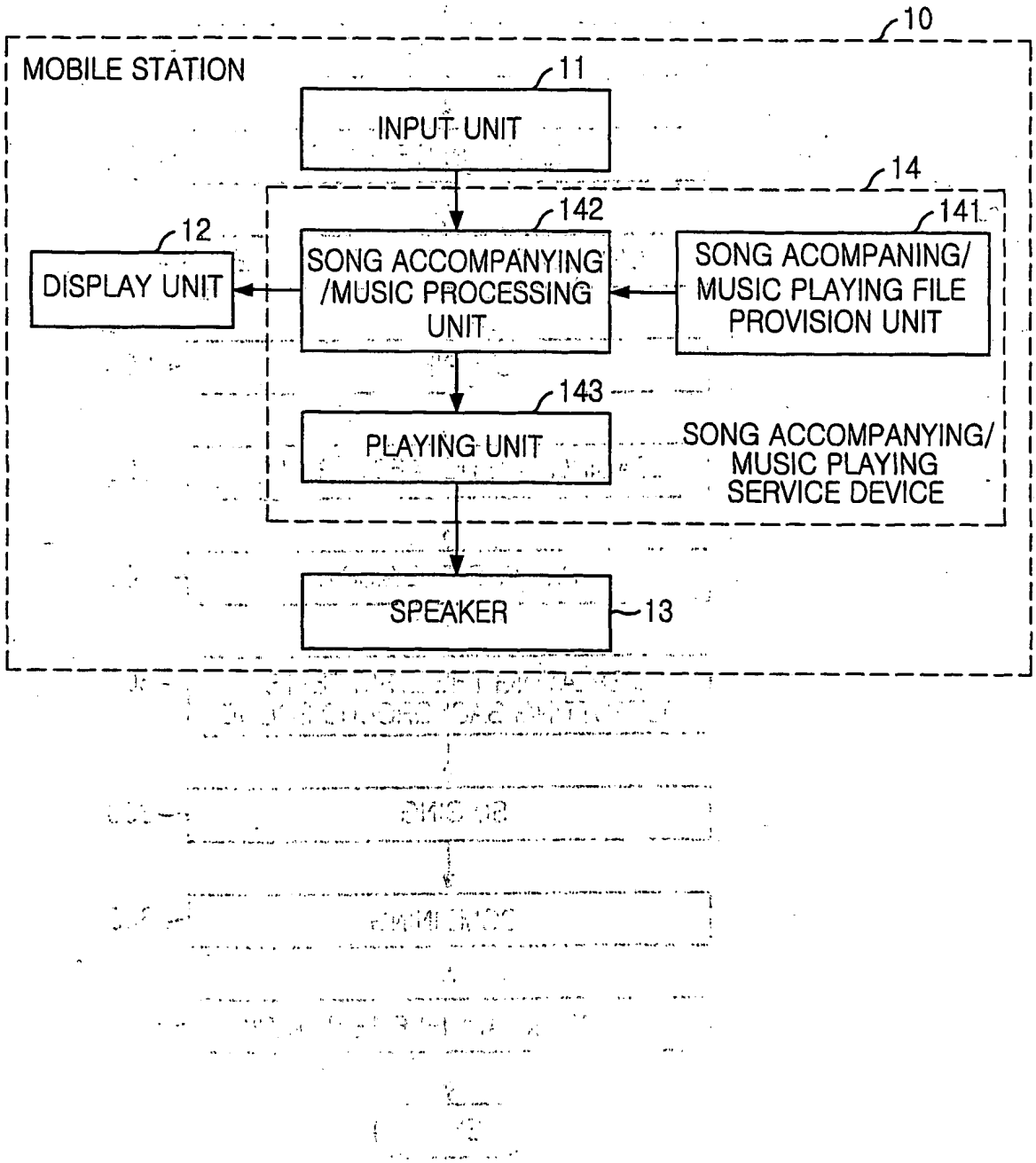

10
MOBILE STATION
11
INPUT UNIT
14
142
141
12
DISPLAY UNIT
SONG ACCOMPANYING /MUSIC PROCESSING UNIT
SONG ACOMPANING/ MUSIC PLAYING FILE PROVISION UNIT
143
PLAYING UNIT
SONG ACCOMPANYING/ MUSIC PLAYING SERVICE DEVICE
SPEAKER
13

FIG. 3

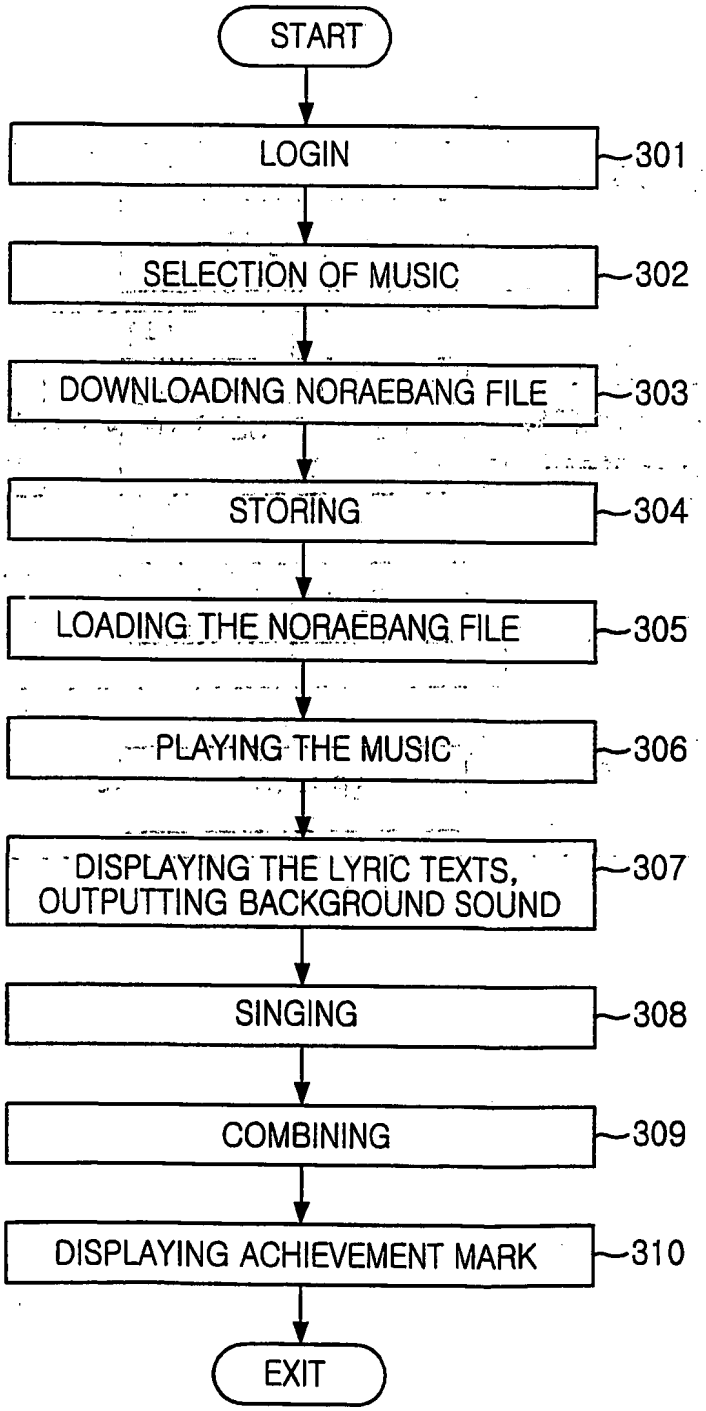

START
LOGIN
301
SELECTION OF MUSIC
302
DOWNLOADING NORAEBANG FILE
303
STORING
304
LOADING THE NORAEBANG FILE
305
PLAYING THE MUSIC
306
DISPLAYING THE LYRIC TEXTS, OUTPUTTING BACKGROUND SOUND
307
SINGING
308
COMBINING
309
DISPLAYING ACHIEVEMENT MARK
310
EXIT

FIG. 4

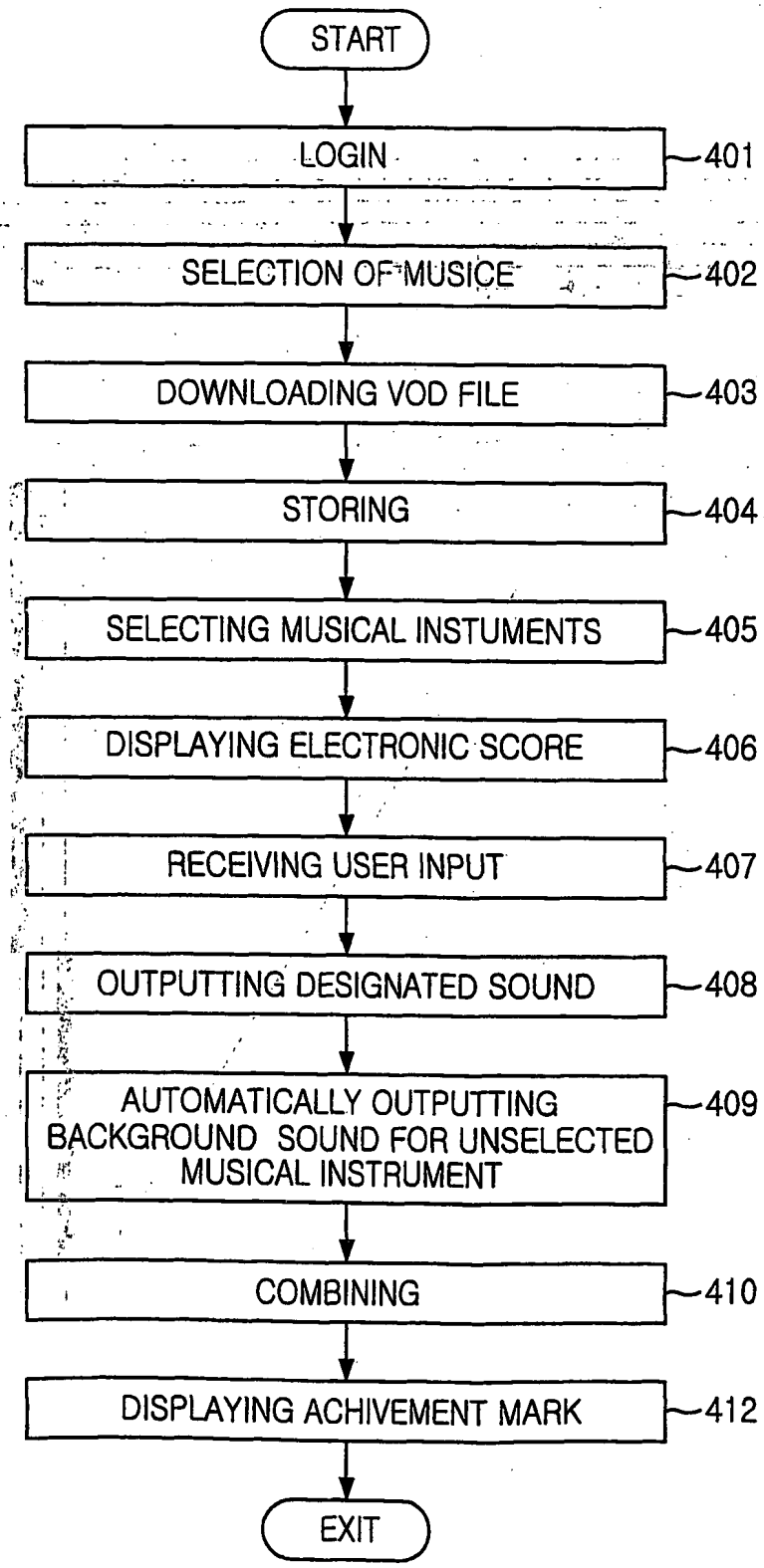

START
LOGIN
401
SELECTION OF MUSICE
402
DOWNLOADING VOD FILE
403
STORING
404
SELECTING MUSICAL INSTUMENTS
405
DISPLAYING ELECTRONIC SCORE
406
RECEIVING USER INPUT
407
OUTPUTTING DESIGNATED SOUND
408
AUTOMATICALLY OUTPUTTING BACKGROUND SOUND FOR UNSELECTED MUSICAL INSTRUMENT
409
COMBINING
410
DISPLAYING ACHIVEMENT MARK
412
EXIT

FIG. 5

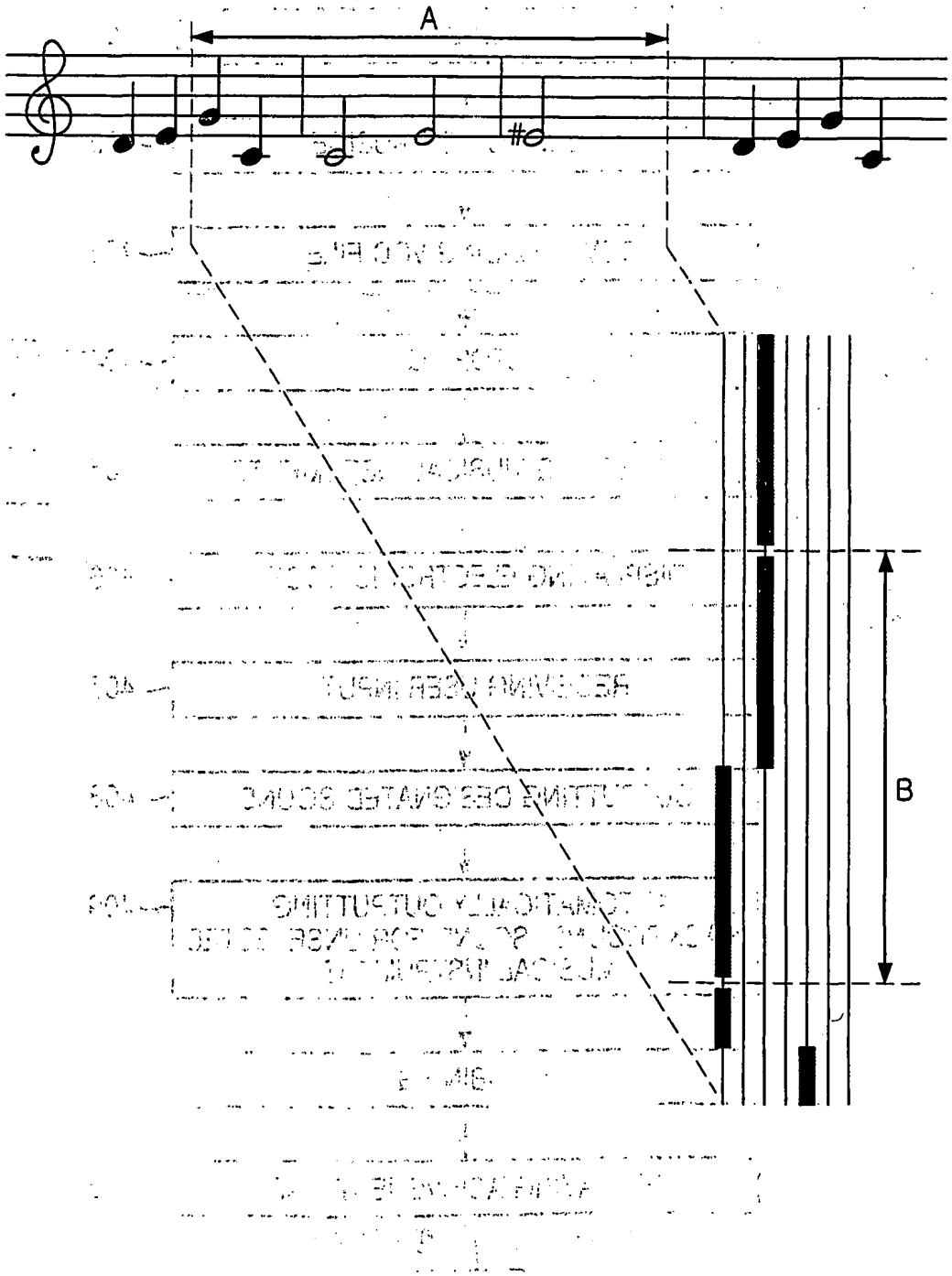


FIG. 6

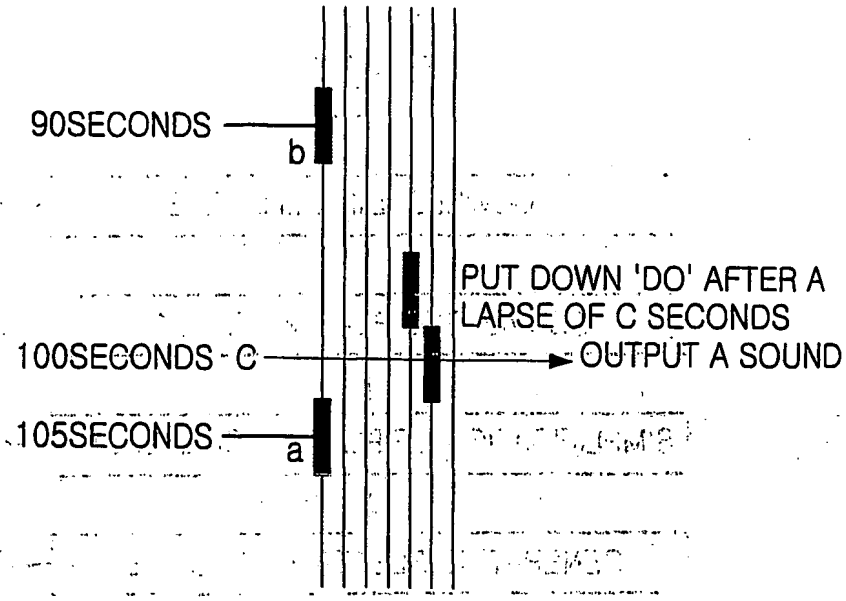

90SECONDS
b
PUT DOWN 'DO' AFTER A
LAPSE OF C SECONDS
100SECONDS - C
OUTPUT A SOUND
105SECONDS
a

FIG. 7

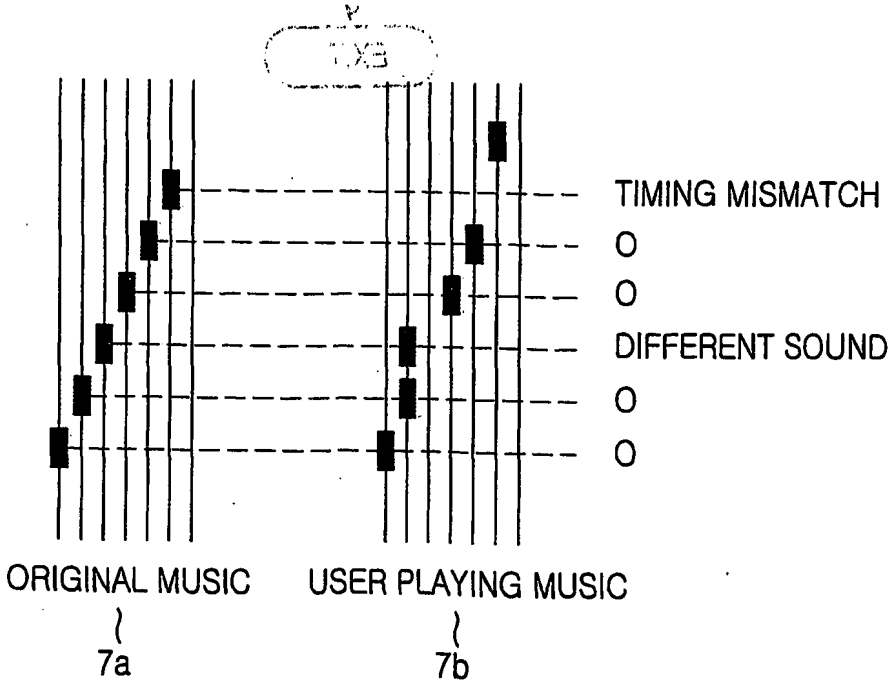

TIMING MISMATCH
O
O
DIFFERENT SOUND
O
O
ORIGINAL MUSIC
USER PLAYING MUSIC
7a
7b

FIG. 8

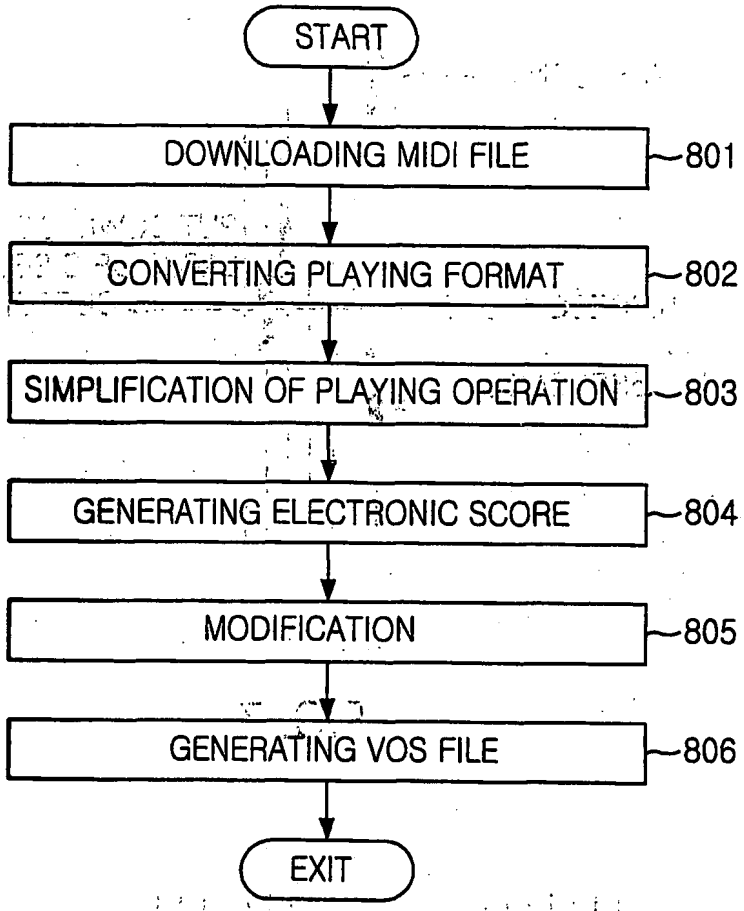


FIG. 9

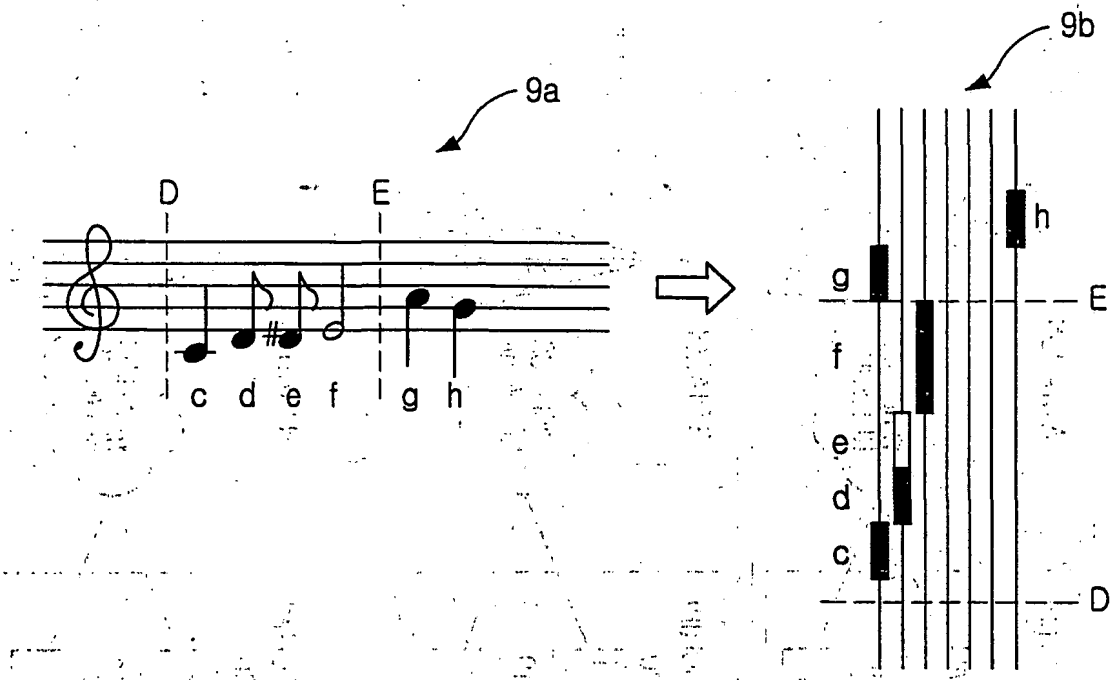


FIG. 10

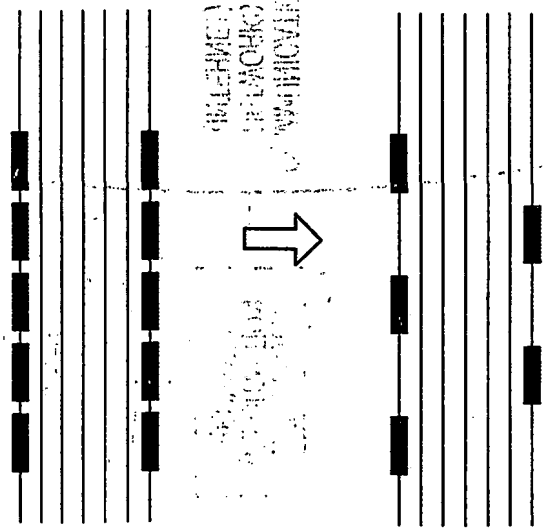
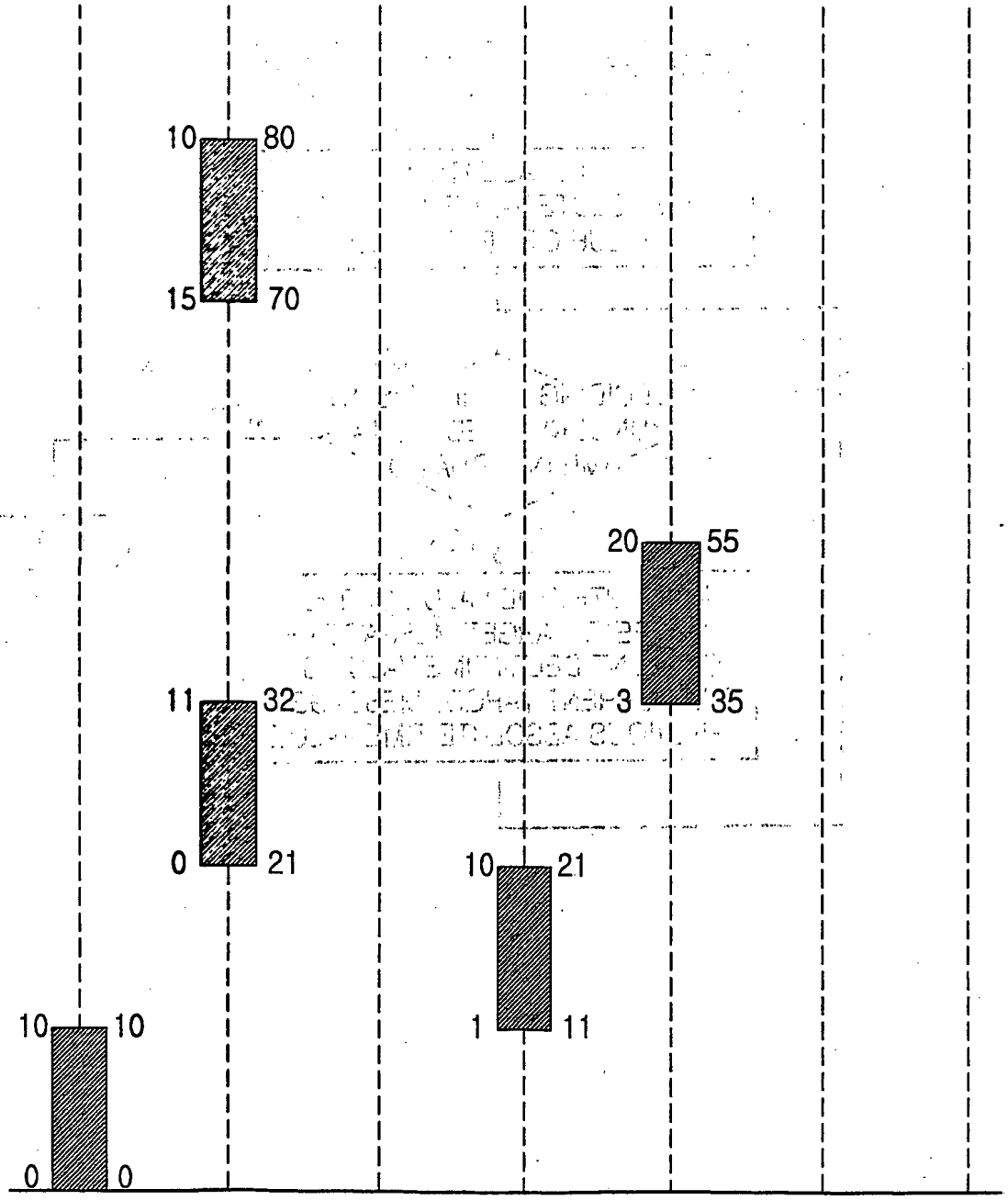


FIG. 12



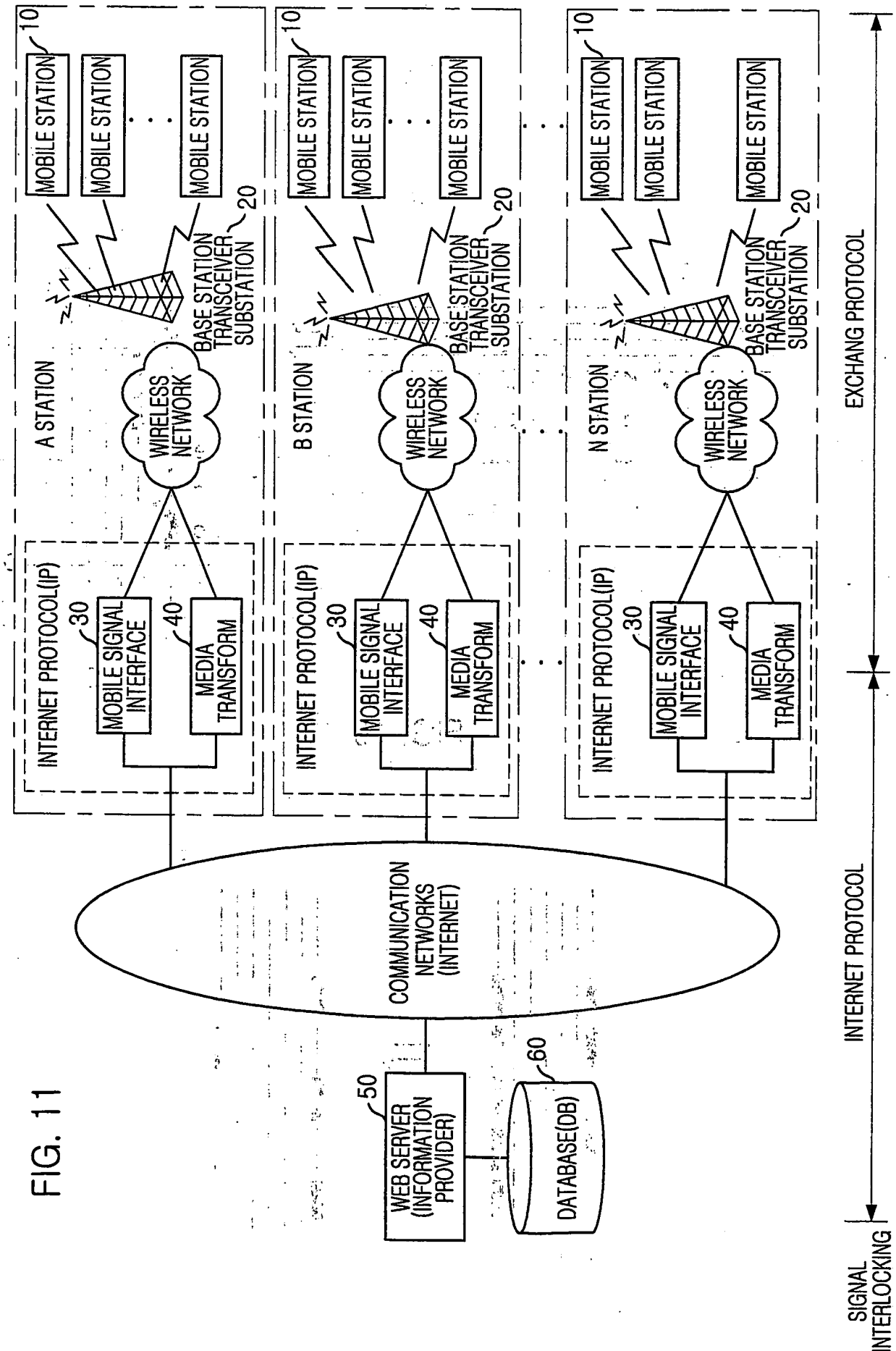
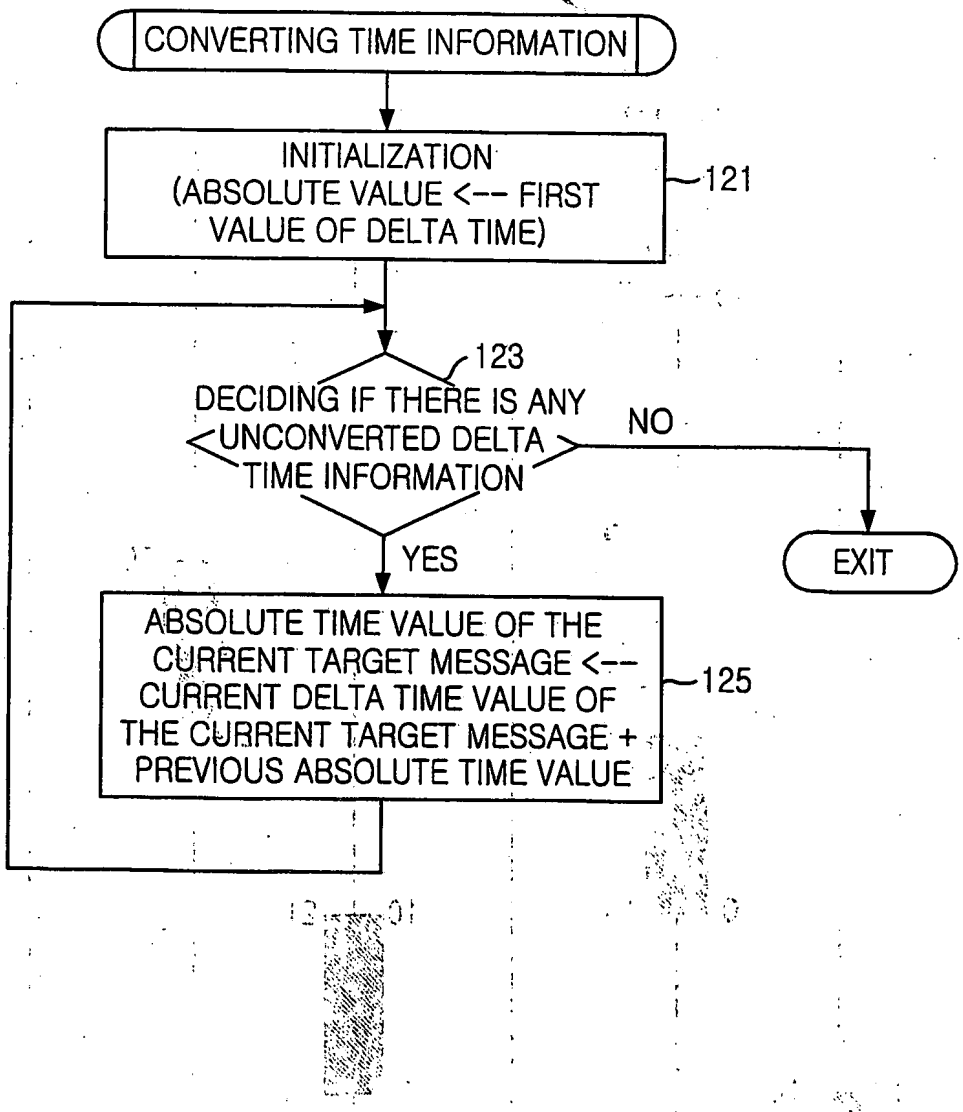

A STATION
B STATION
N STATION
MOBILE STATION
BASE STATION TRANSCEIVER SUBSTATION
WIRELESS NETWORK
INTERNET PROTOCOL(IP)
MOBILE SIGNAL INTERFACE
MEDIA TRANSFORM
COMMUNICATION NETWORKS (INTERNET)
WEB SERVER (INFORMATION PROVIDER)
DATABASE(DB)
EXCHANG PROTOCOL
INTERNET PROTOCOL
SIGNAL INTERLOCKING

FIG. 11

FIG. 13



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR01/00940

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 G11B 20/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 G11B20/00 G11B20/04 A63H5/00 G06F3/14 G09B15/02

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Korean Patents and Applications for Inventions since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

WPI, PAJ "MUSIC""MIDI""MOBILE"WIRELESS""INSTRUMENTAL"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,728,960 (DAVID) 17 MARCH 1998 see the whole document	1, 9
Y	US 5,808,224 (Yamaha Co) 15 SEPTEMBER 1998 see the whole document	1, 9
A	US 5,822,529 (SHOSAKU) 13 OCTOBER 1998 see the whole document	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevence

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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